Amendments to the Claims:

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

1 (currently amended). A method for multitone processing an N level digital image to produce an M level digital image wherein M<N, comprising the steps of:

a) determining M reconstruction levels based on the gray level distribution of the N level image, each said reconstruction level being calculated using respective pixels of said N level image; and

b) applying multilevel ~~dithering~~ error diffusion to the N level digital image using the M reconstruction levels to produce the M level digital image.

2 (original). The method claimed in claim 1, wherein the determining step comprises performing a K-means clustering operation on the N level digital image, wherein K = M.

3 (currently amended). ~~The method claimed in claim 1,~~ A method for multitone processing an N level digital image to produce an M level digital image wherein M<N, comprising the steps of:

a) determining M reconstruction levels based on the gray level distribution of the N level image; and

b) applying multilevel error diffusion to the N level digital image using said M reconstruction levels to produce the M level digital image;

wherein the determining step comprises forming a histogram of the N level digital image and locating said M reconstruction levels corresponding to the M most prominent peaks in the histogram.

4 (original). The method claimed in claim 1, wherein the first and last levels of the M levels are predetermined.

5 (original). The method claimed in claim 4, wherein the first level is zero.

6 (original). The method claimed in claim 4, wherein the last level is the maximum possible level.

7 (currently amended). The method claimed in claim 1, wherein the ~~N-level~~ N level digital image has multiple channels and ~~the k-means~~ K-means clustering and multi-level ~~dithering is~~ error diffusion are performed on each of the multiple channels independently.

8 (currently amended). The method claimed in claim 1, wherein the ~~N-level~~ N level digital image has multiple channels and ~~the~~ K-means clustering ~~is~~ and multi-level error diffusion are performed in ~~the~~ multi-channel vector space ~~and multi-level vector dithering~~.

9 (currently amended). The method claimed in claim 1, wherein the multi-level ~~dithering~~ error diffusion is vector error diffusion.

10 (currently amended). The method claimed in claim 7, wherein the multi-level ~~dithering~~ error diffusion is vector error diffusion.

11 (currently amended). The method claimed in claim 8, wherein the multi-level ~~dithering~~ error diffusion is vector error diffusion.

12 (currently amended). A computer program product comprising computer readable storage medium having a computer program stored thereon for performing the method of claim 1.

13 (new). The method of claim 3 wherein the first and last levels of the M levels are predetermined.

14.(new). The method of claim 3 wherein the N level digital image has multiple channels and said determining and applying steps are applied to each of said multiple channels independently.

15 (new). The method of claim 3 wherein the N level digital image has multiple channels and said determining and applying steps are performed in multi-channel vector space.

16 (new). A method for multitone processing an N level digital image to produce an M level digital image wherein M<N, comprising the steps of:
  clustering pixel values of the N level image into M reconstruction levels based on the gray level distribution of the N level image;
  minimizing error between the N level digital image and the M level digital image during said clustering; and
  applying multilevel error diffusion to the N level digital image using said M reconstruction levels to produce the M level digital image.

17 (new). The method of claim 16 wherein said clustering and minimizing steps further comprise performing a K-means clustering operation on the N level digital image, wherein K = M.

18 (new). The method of claim 16 wherein the first and last levels of the M levels are predetermined.

19 (new). The method of claim 16 wherein the N level digital image has multiple channels and K-means clustering and multi-level error diffusion are performed on each of the multiple channels independently.

20 (new). The method claimed in claim 16, wherein the N level digital image has multiple channels and K-means clustering and multi-level error diffusion are performed in multi-channel vector space.

21 (new). A method for multitone processing an N level digital image to produce an M level digital image wherein M<N, comprising the steps of:

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setting initial values of M cluster centers;

assigning pixels of the N level digital image to said cluster centers to provide assigned pixels;

calculating new values of said cluster centers based upon respective said assigned pixels;

repeating said assigning and calculating until a predetermined stopping condition is reached and, thereby, final values of said cluster centers are defined;

selecting said final values of said cluster centers as reconstruction levels; and

applying applying multilevel error diffusion to the N level digital image using said reconstruction levels to produce the M level digital image.

22 (new). The method of claim 21 wherein said assigning minimizes respective mean squared error.

23 (new). The method of claim 21 wherein said stopping condition is a predetermined threshold.

24 (new). The method of claim 21 wherein first and last of said reconstruction levels are predetermined.

25 (new). The method of claim 21 wherein the N level digital image has multiple channels and said setting, assigning, calculating, repeating, selecting, and applying steps are performed independently on each of said multiple channels.

26 (new). The method of claim 21 wherein the N level digital image has multiple channels and said setting, assigning, calculating, repeating, selecting, and applying steps are performed in multi-channel vector space.